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SUPERFUND DIVISION

August 17, 2001
Project 49-F0K96219.01

Commander
U.S. Army Engineer District, Kansas City
ATTN: CENWK-PM-E (Mr. Bradley Eaton)
700 Federal Building
601 East 12th Street
Kansas City, Missouri 64106-2896

Re: Transmittal of Draft Site Specific Environmental Baseline Survey Work Plans
St. Louis Army Ammunition Plant, St. Louis, MO
Contract No. DACW41-96-D-8014 Task Order No. 0019


Dear Mr. Eaton:

We are hereby transmitting three copies of the subject document. Distribution of the remaining copies has been made in accordance with the attached distribution list.

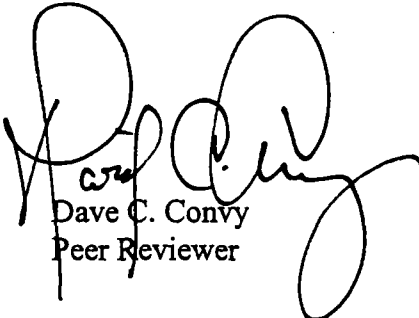
Please call Bob Skach at 913/344-1158 if you require additional information.

Very truly yours,

URS Group, Inc.



Robert F. Skach P.E.
Project Manager



Dave C. Convy
Peer Reviewer

Enclosures

40330665



Superfund

URS Corporation
10975 El Monte, Suite 100
Overland Park, KS 66211
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**DISTRIBUTION LIST
DRAFT WORK PLANS
SITE-SPECIFIC ENVIRONMENTAL BASELINE SURVEY
ST. LOUIS ARMY AMMUNITION PLANT
ST. LOUIS, MISSOURI**

**CONTRACT NO. DAA41-96-D-8014
TASK ORDER NO. 0019**

Organization	No. of Copies	Documents
U.S. Army Aviation and Missile Command ATTN: Sandy Olinger	3	All
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Arrowhead Contracting, Inc. ATTN: Bryant Krouch	1	All
Tetra Tech EM, Inc. ATTN: Eduardo Gasca	1	SAP only



Review Meeting
Site-Specific Environmental Baseline
Survey
Working Draft Field Sampling Plan
Former St. Louis Army Ammunition Plant
1 August 2001

AGENDA

- **Welcome and Introductions – Bob Skach** 0900
- **Review of 16-17 May Meeting & Comprehensive EBS Report Status**
 - Sandy Olinger / Bob Skach 0910
- **Building 3 Remediation Project Status Report**
 - Greg Wallace 0920

AGENDA (Cont.)

- **Site-Specific EBS Project Organization**
 - Bob Skach 0945
- **Workplans**
 - **Sampling and Analysis Plan**
 - **Field Sampling Plan (FSP)**
 - **Quality Assurance Project Plan**
 - **Safety Health & Emergency Response Plan**
 - **Quality Control Plan**
- **FSP Overview – Bob Skach** 1000

**Review Of 16-17 May Meet And
Comprehensive EBS Report Status**

Sandy Olinger / Bob Skach

**Building 3 Remediation Project
Status Report**

Greg Wallace

★ - See Notes on Arrowhead presentation (back of this page)
on Bid 3 sampling

Suppose to be the same as
an RI. It will lead to an FS.

Site-Specific EBS Project Organization

Workplans

- Sampling and Analysis Plan
 - Field Sampling Plan
 - Quality Assurance Project Plan
- Safety Health & Emergency Response Plan
- Quality Control Plan

Field Sampling Plan (FSP)

■ Section 1.0 - Introduction

- Presents an introduction to the SAP and this FSP, including site history, environmental setting, an overview of site operations and process knowledge, and a summary of the comprehensive EBS

■ Section 2.0 - Project Organization and Responsibilities

- Identifies organizations, roles, and responsibilities for key personnel to be used during the field activities

Field Sampling Plan (FSP)

■ Section 3.0 - Sampling Program Rationale

- Presents a sampling strategy based on the data quality objective (DQO) process

■ Section 4.0 - Field Activities

- This section presents a description of the field activities, the rationale for conducting the activities, the field protocols to be used during the activities, and laboratory analysis for the planned sampling activities

Field Sampling Plan (FSP)

■ Section 5.0 - Sample Chain-of-Custody/ Documentation

- Presents details regarding sample documentation including field logbooks, sample labels, sample collection field sheets and chain-of-custody

■ Section 6.0 - Sample Packing and Shipping

- Presents details regarding sample packaging, shipping and archiving

Field Sampling Plan (FSP)

- **Section 7.0 - Investigation Derived Waste**
 - Presents details regarding handling, storage, and disposal of investigation derived waste
- **Section 8.0 - Daily Chemical Quality Control Reports (DCQCR)**
 - Presents details regarding quality control reports
- **Section 9.0 - Corrective Actions**
 - Presents a discussion of corrective actions for non-conformances identified in the field

Field Sampling Plan (FSP)

- **Section 10.0 - Project Schedule**
 - Presents a schedule for the field activities and reporting associated with this FSP
- **Section 11.0 - References**
 - Presents references that are relevant to the basis of this FSP

Sampling Program Rationale

- Nature & Extent -

Bryant Kroutch

Data Quality Objectives

- State the Problem
- Identify the Decision
- Identify Inputs to the Decision
- Define the Study Boundaries
- Develop a Decision Rule
- Specify Limits on Decision Errors
- Optimize the Design for Obtaining Data

State The Problem

Objective of the sampling program is to collect sufficient data to support transfer of the property consistent with the Finding of Suitability to Transfer (FOST) Process

Identify The Decision

FOST determines that a real property is environmentally suitable for transfer because:

- 1) The property has never been contaminated; OR, *not*
- 2) The property has been contaminated but is still suitable for transfer because:
 - Remedial actions have been taken to protect human health and the environment consistent with the property's intended use; or
 - Contamination is present at levels that do not represent a threat to human health and the environment, consistent with the intended use.

Consequently, decisions associated with this effort include:

- Is an unacceptable risk posed by the site? - *risk assessment*
- If so, can an appropriate remedy be selected?

partly

partly

need a characterization

Identify Inputs To The Decision

Comprehensive EBS (Tetra Tech, December 2000)

- EBS has identified numerous areas of environmental concern on a building-by-building basis

Recent Site Visits Conducted by Project Staff

- Meeting with members of the regulatory community to finalize the Comprehensive EBS
- Process knowledge of the buildings and the operations

Definition Of Study Boundaries

- Effort primarily focuses on environmental data within 10 feet of the ground surface
- Sample media include concrete, surface soil, subsurface soil, surface wipes, site-wide sewers, sediment, and/or surface water
- Areas of concern are generally established at the "building scale." Consequently, the sampling regiment is defined on a building-by-building basis
- Phased approach to data collection (primary and pre-approved contingency locations) should allow collection of all pertinent data during a single mobilization to the field.

Development Of A Decision Rule

- Ultimate decision is whether or not property is environmentally suited for transfer.
- Accordingly, samples will be collected to quantify nature and extent and to calculate risk in order to select a remedy.
 - Samples collected to determine the nature and extent of contamination will be collected in phases. Contingency samples will be collected if primary samples exceed EPA Residential Preliminary Remediation Goals or MDNR CALM Scenario A levels.
 - Data collected to support the risk evaluation are not subject to any particular decision rule. Rather, these data will be utilized to calculate carcinogenic and non-carcinogenic affects.

Evaluate Decision Errors And Optimize Design

Two possible decision errors may occur:

- Decide not to remediate an area when the correct decision would be to remediate (false negative).
- Decide to remediate when the correct decision would be to "walk away" (false positive).

False negative - very unlikely. Analytical reporting levels will be established commensurate with residential PRGs or CALM levels. Industrial nature of site will likely have higher cleanup goals.

False positive - minimized by gridded sampling approach. Rather than collect merely "hot spot" data associated with nature and extent objectives, risk assessment samples will be collected from a uniform grid at each building location.

Background – Site-Wide

■ Asbestos Containing Material (ACM)

- ACM documented in the Comprehensive EBS

■ Lead-Based Paint (LBP)

- LBP is assumed to be present within and around each of the buildings
- Handle LBP per regulations

Background – Site-Wide (Cont.)

■ Fluorescent Light Ballast (PCBs)

- To be removed as required

■ Sewer System

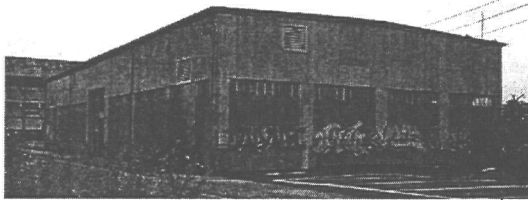
- Potential releases to and from the sewer system.

■ Groundwater

- Localized perched units at least 12 ft. bgs
- Lack of a complete pathway to any receptor

Background – Building 1

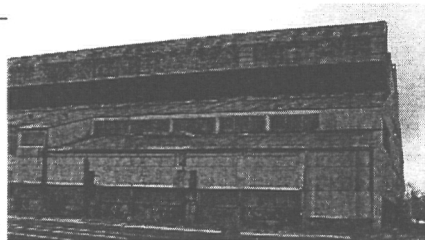
- Billet Cutting Bldg.
- One-story, 8,770 square feet
- Built in 1944
- Supported only SLAAP operations
- Used to nick, break, and grind steel bars into 8½-inch billets
- Comprehensive EBS reported a PCB oil stain and metals contamination associated with the billet storage area and sump/sewer system



Built for
SLAAP

Background – Building 2

- Forge Building
- Five-story. Building footprint of approximately 73,000 square feet
- Built in 1944
- Supported only SLAAP operations
- Forged billets (received from Building 1) through a series of heating, forging, and quenching operations
- Comprehensive EBS identified metal contamination in surface soil and surface water, chlorinated solvents in groundwater, and potential PCBs associated with hydraulic oils
- Regulatory concern with regard to TPH from the fuel lines/vaults was raised during finalization of the Comprehensive EBS



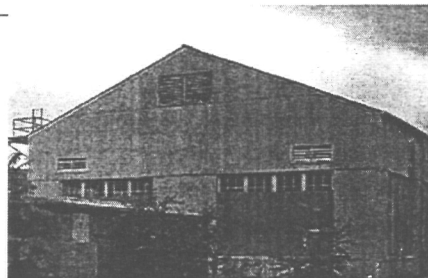
Background – Building 3

- Machining Building
- Two-stories with basement and penthouses.
Building footprint of approximately 170,000 sq. ft.
- Built in 1941
- Supported .30 caliber production from 1941 to 1944.
Supported 105-mm Howitzer production thereafter
- Processes included shell shaping, heat tracing, cleaning, painting, and packaging
- Comprehensive EBS reported significant PCB contamination associated with the concrete walls and floors (remediation being conducted under separate contract), SVOC contamination in the soil near the chip chute area, VOC and PCB contamination near the north loading dock, and airborne pesticides in the basement



Background – Building 4

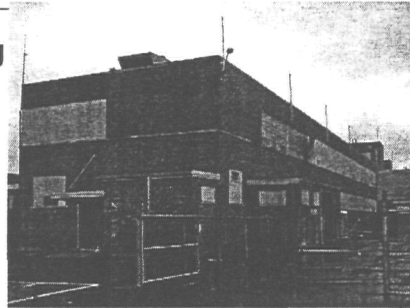
- Air Compressor Building
- One-story with basement.
Building footprint of approximately 8,500 sq. ft.
- Built in 1944
- Housed air compressors used to generate compressed air for processes performed in all other SLAAP buildings.
- Comprehensive EBS reported PCBs in oil stains under electrical equipment and transformer pads and cited the potential for PCBs in the compressor pits



also do 2 compressor pits.

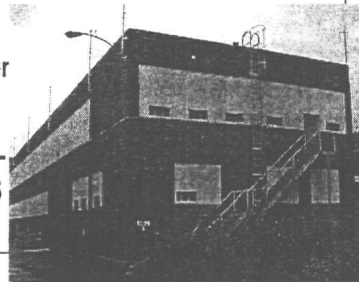
Background – Building 5

- Headquarters and Office Building
- Two-story with basement and penthouse. Building footprint of approximately 12,000 sq. ft.
- Built in 1941, converted to office space in 1944
- Housed primer loading operations (.30 caliber production) until 1944. Provided office space thereafter.
- Comprehensive EBS reported PCBs in oil stains associated with the elevator equipment and SVOC-contaminated soil outside of Building 5



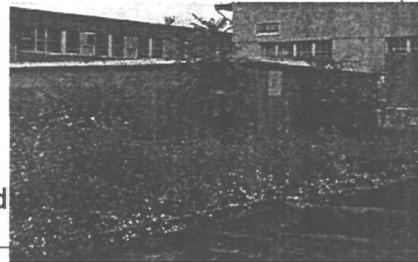
Background – Building 6

- West Office and Laboratory Building
- Two-story with basement and penthouse. Building footprint of approximately 10,500 square feet
- Built in 1941, converted to office and laboratory space in 1944
- Housed primer insert operations (.30 caliber production) until 1944. Provided office and lab space thereafter
- Comprehensive EBS reported metal contamination in hearth ash and SVOC-contaminated soil outside of Building 6



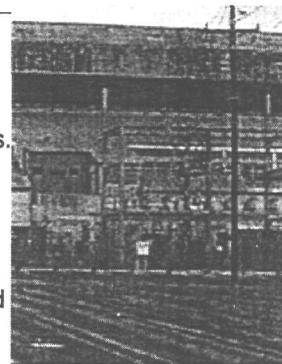
Background – Building 7

- Water Pump House and Cooling Tower
- One-story, approximately 1,000 square feet. Tower (now demolished) was about 15 feet high
- Built in 1944
- Housed water pumps to circulate process (coolant) water between Buildings 2 and 4.
- Comprehensive EBS reported no environmental areas of concern. However, concrete staining in the building and chromium from the cooling tower are further addressed



Background – Building 8

- Fuel Storage Area and Oil Pumphouse
- One-story, approximately 635 square feet with a open storage area surrounded by earthen dams.
- Built in 1944
- From 1944 to 1958, Building 8 was located north of Building 2, at a location that is now covered by Interstate 70 Highway. The building was relocated in 1958 during construction of the Interstate 70.
- Pumped fuel oil from storage tanks to rotary furnaces within Building 2.
- Comprehensive EBS reported SVOC contamination in the soil. Regulatory comments received during finalization of the EBS requested additional characterization beneath the fuel lines.



Background – Building 9

- Acetylene Generation Area
- Three single story structures with a sludge pit and an AST.
- Built in 1941, modified in '44, and demolished in early '80s.
- Served as a smokeless powder storage and canning area from 1941 to 1944.
- Converted to acetylene generation area. Calcium carbide and water were mixed to generate acetylene, which was then distributed to Buildings 2 and 3 via underground piping.
- Comprehensive EBS reported no areas of concern.

Background – Building 10

- Quench Oil Storage Tanks
- Three cylindrical, steel USTs and one rectangular, concrete UST
- Built in 1944, and removed in January, 1993.
- Supplied cooling oil (No. 6 fuel oil) to 14 quench oil tanks on the first floor of the east section of Building 3.
- Comprehensive EBS reported no areas of concern, other than completion of closure activities in accordance with MDNR requirements.



Background - Building 11

- Foamite Generator, Building (11) and Hose Cart Shelters (11A & 11B)
- One-story, approximately 274 sq. ft. (11) and 98 sq. ft. each (11A & 11B)
- Built in 1944. From 1944 to 1958, Building 11 was located near Building 8, at a location that is now covered by Interstate 70. The building was relocated in 1958 during construction of the Interstate
- Generated foamite by adding dry foamite powder to pressurized water. May have been used for fire prevention during shut-down periods.
- Comprehensive EBS reported no areas of concern.

Sampling Program Rationale - Risk Assessment -

Jim Garrison

Risk Assessment

- Goal: To provide risk information to support property transfer
- Must address both current and future use
- Soils are primary environmental media of concern
- Sample design based on the concept of "exposure area", using a systematic approach (grid)

Summary of Sample Collection Activities

Area of Concern/ Figure Numbers	Phase	Wp	Gravels	Soil Boring	Test Rt	Soil mat	Window for	AQ1
Site-Wide	Primary					11	11	
Figure 3-10	Contingency							
Building 1	Primary		1	17				
Figures 3-1 and 3-2	Contingency			54				
Figure 3-11	Risk			10				
Building 2	Primary			9	8	2	2	20
Figure 3-3	Contingency			64				
Figure 3-11	Risk			12				
Building 3	Primary		To be determined					
To Be Developed	Contingency							
Figure 3-11	Risk			18				
Building 4	Primary	2	1	3				
Figure 3-6	Contingency		2	14				
Figure 3-11	Risk			10				
Building 5	Primary	1		1				
Figure 3-7	Contingency		1	5				
Figure 3-11	Risk			16				

Summary of Sample Collection Activities (Cont.)

Area of Concern/ Figure Numbers	Phase	W/ps	Corverts	Soil Exchng	Test Rt	Sediment	Water/Air	AZ1
Building 6	Primary	1		1		1		
Figure 3-8	Contingency			4				
Figure 3-11	Risk			16				
Building 7	Primary	1			1			
Figure 3-9	Contingency		1	1	6			
Figure 3-11	Risk			16				
Building 8	Primary			7		2		
Figure 3-3	Contingency			32				
Figure 3-11	Risk			20				
Building 10	Primary		To be determined					
To Be Developed	Contingency							
Figure 3-11	Risk							
Totals	Primary	5	2	38	9	18	13	20
	Contingency		4	174	6			
	Risk			118				

Project Schedule

Activity/Task	Calendar Days to Complete	Date
Field Work Preparation	Completed within 5 days from Approval of Work Plans	9/10/2001
Field Mobilization	3 days	9/13/2001
Field Work - Initial	25 days	10/08/2001
Field Work - Contingency Samples	Started within 2 days of receipt of initial analytical results	10/30/2001
Demobilization	3 days	11/02/2001
Chemical Analysis Completed	14 days after lab receives final samples	11/14/2001
Data Validation Completed	14 days from receipt of final analytical results	11/30/2001
Draft Report	30 days from receipt of final analytical results	01/04/2002
Review/Comments on Draft Report	14 days	01/18/2002
Final Report	30 days from receipt of review comments	02/17/2002

Comments / Discussion



MACHINING BUILDING
(Building 3)

WEST OFFICE BUILDING
(Building 6)

06SW-01 ▲ ● 06SD-01

01SB-04 ▽ ▽ ▽

W-3

TOWER

LEGEND:

- ⊕SWMW-1 MONITORING WELL LOCATION
- ▽01SB-04 SOIL BORING (▽ = CONTINGENCY BORING)
- ▲04SW-02 SURFACE WIPE SAMPLE
- ◆04CS-01 CONCRETE SAMPLE & SOIL BORING (◆ = CONTINGENCY SAMPLE AND BORING)
- 08SD-01 SEDIMENT SAMPLE

40 0 40 80

SCALE

FEET

URS Group Inc.

10975 El Monte, Suite 100
Overland Park, Kansas 66211

CLIENT: ST. LOUIS ARMY AMMUNITION PLANT

LOCATION: ST. LOUIS, MISSOURI

TITLE: **FIGURE 3-8
PROPOSED SAMPLING LOCATIONS
IN BUILDING 6**

PROJ. NO. FOK96219.01	CHK'D. BY M.R.P.	DATE AUG 2001	DWG. NO.
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QUENCH OIL
TANKS (Removed)

ADDITION D

SLUDGE PITS (Removed)

▲ 05SW-01 EAST OFFICE BUILDING
(Building 5)

▽ 05SB-04

SWMW-4

LEGEND:

- ⊕ SWMW-1 MONITORING WELL LOCATION
- ▼ 01SB-04 SOIL BORING (▽ = CONTINGENCY BORING)
- ▲ 04SW-02 SURFACE WIPE SAMPLE
- ◆ 04CS-01 CONCRETE SAMPLE & SOIL BORING (◇ = CONTINGENCY SAMPLE AND BORING)

40 0 40 80

SCALE

FEET

URS Group Inc.

10975 El Monte, Suite 100
Overland Park, Kansas 66211

CLIENT: ST. LOUIS ARMY AMMUNITION PLANT

LOCATION: ST. LOUIS, MISSOURI

TITLE: **FIGURE 3-7
PROPOSED SAMPLING LOCATIONS
IN BUILDING 5**

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F0K96219.01

CHK'D. BY
M.R.P.

DATE
AUG 2001

DWG. NO.

SWMW-2



04CS-01
04SB-01

COMPRESSOR BUILDING
(Building 4)

04SB-03

04SW-02

04SB-02

04SW-01

GARAGE

PUMP HOUSE
(Building 7)

LEGEND:

- ◆ SWMW-1 MONITORING WELL LOCATION
- ▽ 01SB-04 SOIL BORING (▽ = CONTINGENCY BORING)
- ▲ 04SW-02 SURFACE WIPE SAMPLE
- ◆ 04CS-01 CONCRETE SAMPLE & SOIL BORING (◇ = CONTINGENCY SAMPLE AND BORING)

40 0 40 80

SCALE

FEET

URS Group Inc.

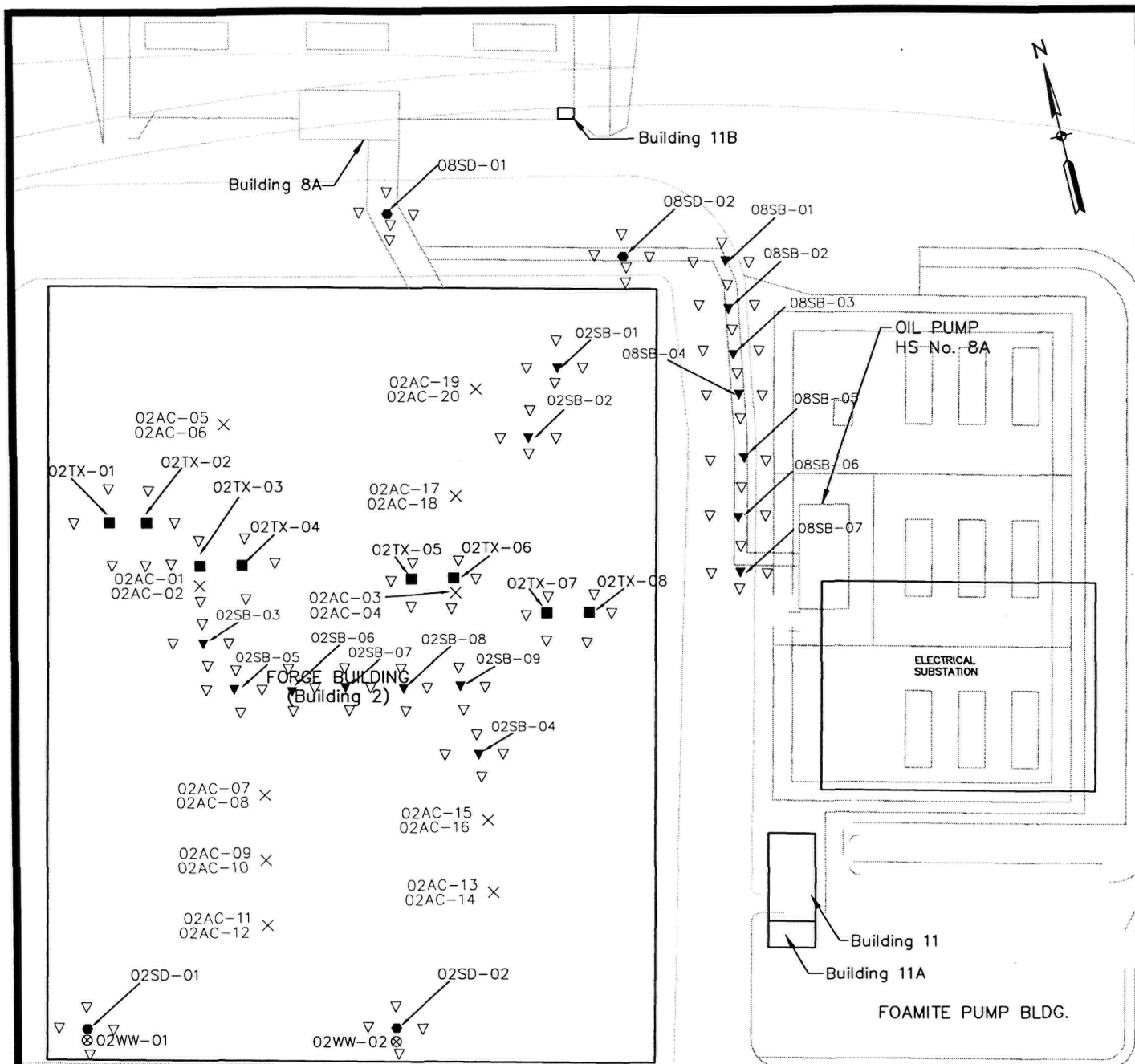
10975 El Monte, Suite 100
Overland Park, Kansas 66211

CLIENT: ST. LOUIS ARMY AMMUNITION PLANT

LOCATION: ST. LOUIS, MISSOURI

TITLE: **FIGURE 3-6
PROPOSED SAMPLING LOCATIONS
IN BUILDING 4**

PROJ. NO. FOK96219.01	CHK'D. BY M.R.P.	DATE AUG 2001	DWG. NO.
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LEGEND:

- ◆ SWMW-1 MONITORING WELL LOCATION
- ▼ 01SB-04 SOIL BORING (▼ = CONTINGENCY BORING)
- ◆ 04CS-01 CONCRETE SAMPLE & SOIL BORING (◆ = CONTINGENCY SAMPLE AND BORING)
- 07TX-01 TEST PIT (■ = CONTINGENCY BORING)
- ▲ 04SW-02 SURFACE WIPE SAMPLE
- 08SD-01 SEDIMENT SAMPLE
- ⊗ 02WW-01 WASTEWATER SAMPLE
- × 02AC-02 ACM SAMPLE

60 0 60 120

SCALE

FEET

URS Group Inc.

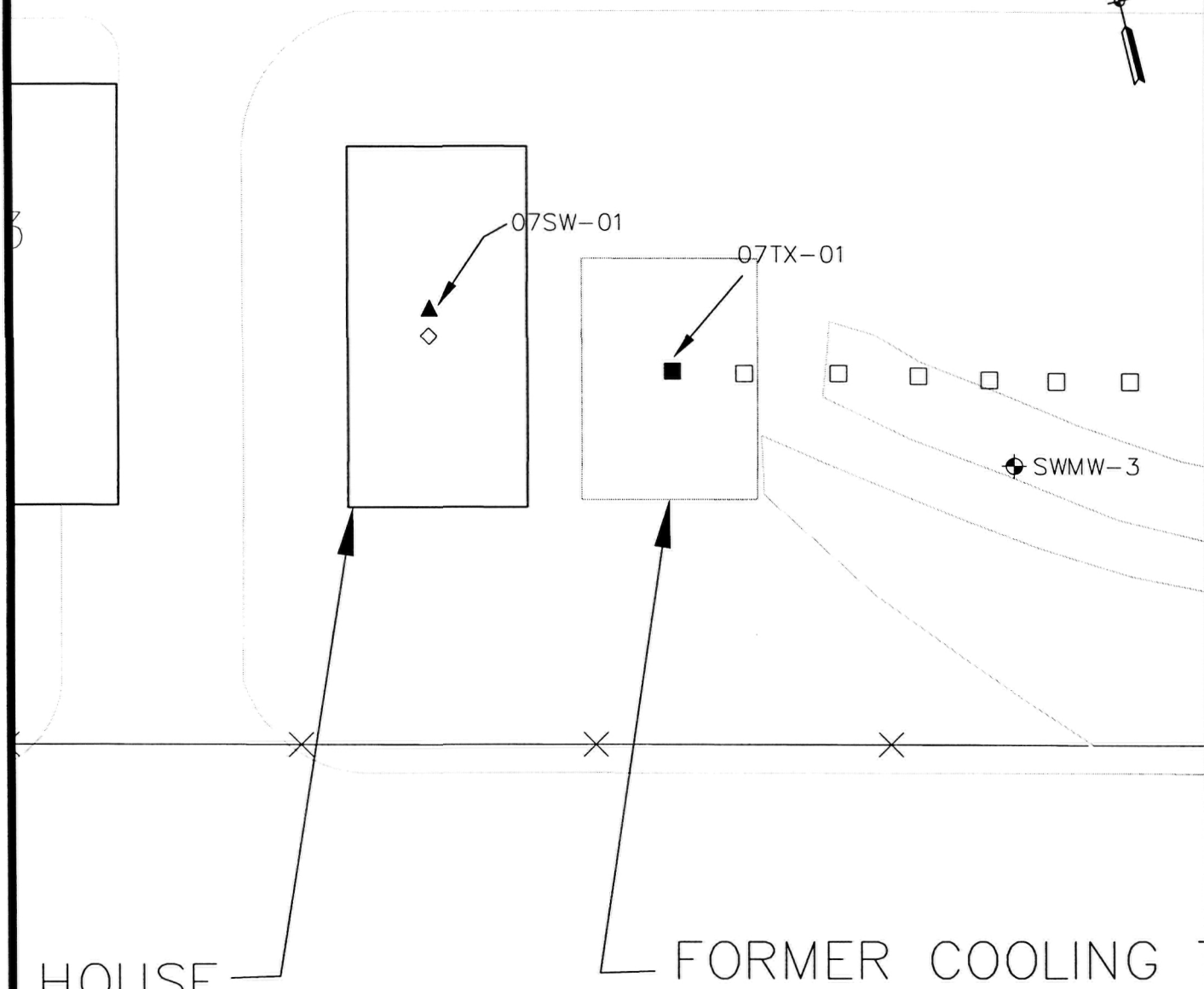
10975 El Monte, Suite 100
Overland Park, Kansas 66211

CLIENT: ST. LOUIS ARMY AMMUNITION PLANT

LOCATION: ST. LOUIS, MISSOURI

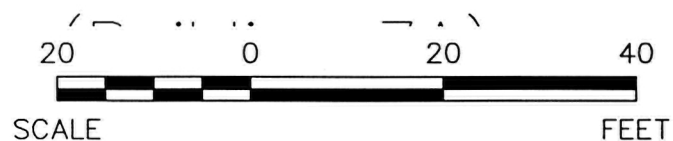
TITLE: **FIGURE 3-3**
PROPOSED SAMPLING LOCATIONS IN
BUILDINGS 2, 8 AND 8A

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LEGEND:

- ⊕ SWMW-1 MONITORING WELL LOCATION
- 07TX-01 TEST PIT (□ = CONTINGENCY BORING)
- ▼ 01SB-04 SOIL BORING (▽ = CONTINGENCY BORING)
- ▲ 04SW-02 SURFACE WIPE SAMPLE
- ◆ 04CS-01 CONCRETE SAMPLE & SOIL
04SB-01 BORING (◇ = CONTINGENCY SAMPLE AND BORING)



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Overland Park, Kansas 66211

CLIENT: ST. LOUIS ARMY AMMUNITION PLANT

LOCATION: ST. LOUIS, MISSOURI

TITLE: **FIGURE 3-9
PROPOSED SAMPLING LOCATIONS
IN BUILDING 7**

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